

REMARKS

Claims 1-9, 12-14, and 18-29 are pending in the application. Claims 1, 7, 8, and 9 are currently amended. Claims 10, 11, and 15-17 are cancelled. Claims 19-29 have been withdrawn from consideration. Applicants respectfully request for allowance of claims 1-9, 12-14, and 18.

Rejections under 35 USC 103

Claims 1-9 and 12-14 are rejected under 35 USC 103(a) as being unpatentable over US Patent No. 6,423,205 to Akahori et al. (hereinafter referred to as “Akahori”) and US Patent No. 6,733,646 to Sato et al. (hereinafter referred to as “Sato”).

Independent claim 1, as amended, is directed to an apparatus for treating a raw feed containing ions. With reference to FIG. 2, for example, the apparatus comprises an electromembrane device (e.g., the dotted box) having means for conveying the raw feed thereto and treated feed therefrom (e.g., a liquid stream indicated by an arrow to the dotted box and another arrow pointing away from the box), an anode (e.g., 102), a cathode (e.g., 103), an electrolyte solution and means for conveying at least one stream of the electrolyte solution between the cathode and anode (e.g., a liquid stream indicated by arrow 110) which are

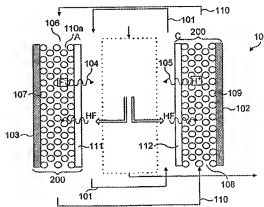


FIG. 2

arranged to apply an electric current to drive electrodeionisation in the electromembrane device for removal of the ions from the raw feed into a stream of concentrate (e.g., a liquid stream indicated by an arrow 101), wherein the raw feed is not in direct contact

with the anode or the cathode; and means for transferring selected ions (e.g., 104 and 105) from the stream of the electrolyte solution into the stream of concentrate upon application of the current, wherein the stream of the electrolyte solution (e.g., 110) is separate from the stream of concentrate (e.g., 101).

Akahori does not teach or suggest “the stream of the electrolyte solution is separate from the stream of concentrate.” In fact, Akahori does not teach a stream of electrolyte solution at all. For example, Akahori teaches that the concentration compartment can be used as the electrode compartment, thereby eliminating the need for a separate stream of electrolyte solution in the electrode compartment. *See, col. 7, lines 55-59.* If an electrode compartment is used, an ion conducting spacer constructed by one or more ion-exchanging membranes, instead of a stream of electrolyte solution, is inserted in the electrode compartment for improving the conductivity between the electrodes. *See, col. 9, lines 34-39.* Either way, Akahori fails to teach a stream of electrolyte solution that is separate from the stream of concentrate.

Neither does Sato teach or suggest “the stream of the electrolyte solution is separate from the stream of concentrate.” As illustrated in FIGs. 1 and 2 of Sato, the stream of fluid circulating in the electrode compartments 17/17’ and 18/18’ originates from a stream of concentrate produced by the concentrating compartments 15/15’. This clearly differs from the claimed invention.

It would not have been obvious for a person skilled in the art to modify Akahori in view of Sato by separating the stream of fluid circulating in the electrode compartments from the stream of concentrate. The primary objective of Akahori is to reduce the voltage required between the anode and cathode during a deionization process.

See, col. 5, lines 29-36. Akahori achieves the objective by increasing the conductivity between the anode and cathode partly through either using the concentration compartment as the electrode compartment or inserting an ion conducting spacer into the electrode compartment. Replacing the concentrate with the electrolyte solution is likely to reduce the conductivity, and therefore teaches away from Akahori's objective.

Unlike Akahori, one objective of the claimed invention is to prevent the ions in the concentrate from reaching the electrodes, thereby prolonging their useful lives. *See, the specification, page 2, first paragraph.* Thus, in no circumstance would the claimed invention motivate a person skilled in the art to mingle the stream of electrolyte solution with the stream of concentrate.

As such, Applicants respectfully submit that claim 1, as amended, is patentable over Akahori and Sato under 35 USC 103(a). Accordingly, claims 2-9 and 12-14 that depend from claim 1 and include all the limitations recited therein are also patentable over Akahori and Sato under 35 USC 103(a).

Claim 18 is rejected under 35 USC 103(a) as being unpatentable over Akahori and further in view of US Patent No. 3,330,750 to McRae et al. (hereinafter referred to as "McRae").

Claim 18 depends from claim 1 and includes all the limitations recited therein. For the reasons discussed above, Applicants respectfully submit that claim 18 is patentable over Akahori and McRae under 35 USC 103(a).

CONCLUSION

Applicants have made an earnest attempt to place this application in an allowable form. In view of the foregoing remarks, it is respectfully submitted that the pending claims are drawn to a novel subject matter, patentably distinguishable over the prior art of record. Examiner is therefore respectfully requested to reconsider and withdraw the outstanding rejections.

Should Examiner deem that any further clarification is desirable, Examiner is invited to telephone the undersigned at the below listed telephone number.

Applicants do not believe that any additional fee is due, but as a precaution, the Commissioner is hereby authorized to charge any additional fee required by the submission to deposit account number 50-4244.

Respectfully submitted,

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